In this book he refers to the numerous false notions that were at that time prevalent in regard to its motion. It would seem from his preface that all the explanations previously given as to how a gyroscope sustained itself against the action of gravity were incorrect. If Ferrel had understood the gyroscope, I believe he would undoubtedly have applied its analysis to the cyclone; but, failing this, his attempted demonstration that "if the fluid gyrates from right to left, the whole mass has a tendency to move toward the north," will not stand the test of examination.

As for note 5 on page 517, MONTHLY WEATHER REVIEW, 1903, I think this much can be said. The tension of the atmosphere is at all times due to the tension of the dry air plus the tension of the aqueous vapor, so that if at any time this latter tension is taken away by the condensation of the vapor into water, this must cause an inrushing of the winds to restore the equilibrium. The maintenance of the energy necessary to propel a cyclone can only be derived from the latent heat set free by precipitation, and if this constant supply of fresh energy be not forthcoming, the cyclone must soon stop on account of friction.

EXTRACT FROM THE EDITOR'S LETTER TO DOCTOR CORDEIRO.

Dated March 28, 1904.

It is a very ungracious task for an editor to publish his own notes in connection with an author's contribution to his journal. I believe that editors sometimes reject that which they do not agree with, or " edit " to suit their own ideas. In your case, I think that, as the mechanics of the atmosphere is so difficult and yet so important, I will publish a part of your letter of March 21, and invite public discussion on the subject. In general, the motions of the atmosphere can not be treated as the motions of a solid or group of solids, and nothing but the most rigorous hydro-dynamics is of any real value to meteorology. Professor Ferrel's reasoning on the movements of a cyclone poleward is precisely like your own, so far as I can see. You say he was unfamiliar with the analysis of the gyroscope and that few, if any, understood the subject in 1857, and that Major Barnard was the first in this country to give a clear exposition of its motion in his memoir of 1859. I fear that you have forgotten a part of the history of our science. The gyroscope was perfectly foreshadowed by Poisson. Barnard simply put his ideas into convenient shape as a slight modification of the great problems of the top and the rotation of the earth on its axis, both of which had been discussed for a century before his time. The special case of Foucault's gyroscope was abundantly discussed in French scientific literature from 1848 to 1853, and the discussion was perfectly well known to Professor Ferrel. In fact, his very first published paper, in 1851, was a popular explanation of the gyroscope or rotascope, as it was called. His whole early life had been given to the study of the movements of bodies on the earth's surface, and it was only necessary for him to quote the equations and principles of analytical mechanics, as set forth in LaPlace's Mecanique Celeste. Major Barnard's explanation is excellent, but it is entirely wrong to say " that all the explanations previously given as to how a gyroscope sustains itself against the action of gravity were incorrect."

Your idea that " if the vapor tension in the atmosphere is diminished by the condensation of the vapor into water, this must cause an inrushing of the winds to restore the equilibrium " is as old as Hutton in England and his contemporaries in Germany; it was utterly demolished by Espy and has no place in meterology.

Your idea that the " energy necessary to propel a cyclone can only be derived from the latent heat set free by precipitation " is that which Espy fought for all his life, and was adopted by Ferrel up to within a year of his death. Eventually, however, he saw that there is another source of energy even more important, and they both are combined in our storms. During the last fifteen years, our problem has been to get at the proper relation of these two sources of energy.

Thank you very much for your little book on hypsometry. I notice that in the preface of 1897 you state that this subject "has not been touched upon since 1851, when it was discussed by Guyot." Here, again, you ignore completely a very large and important literature.—*C. A.*

<div align="center">

NOTES AND EXTRACTS.

</div>

METEOROLOGY IN ROUMANIA.

The last annual report of the Roumanian Meteorological Service[1] forms, as usual, a bulky folio of some 700 pages, with the text in both French and Roumanian, in parallel columns. The data for 1900 are given in considerable detail, and include for Bukharest, which alone is classed as a station of the first order, observations of ozone, evaporation, temperature of the unprotected thermometer at various heights above the ground, and temperature of the soil, but to a depth of only 120 centimeters. Observations at this station are given separately for each hour of every day for pressure, temperature, vapor pressure, relative humidity, wind direction and velocity, sunshine, solar radiation, and precipitation, with cloud observations hourly from 7 a. m. to 8 p. m. These figures are averaged for months, decades, and pentads, and the whole is recapitulated by months, seasons, years, lustrums, and decenniums, and for the whole period of observations, 1885–1900. Tridaily observations are published for 12 selected stations of the second order, with monthly and annual summaries for the entire 52 of this class, and this exhaustive collection of data is completed by the records of 340 rainfall stations.

A reduction in the station force delayed the publication of the volume until the fall of 1903. Observations are published for 1900 only, but the administration report includes in addition the two following years. There has been a steady increase in the number of stations, from 386 in 1899 to 401 in 1902, including 343 rainfall stations, and 58 regular stations, or one of the latter to each 849 square miles. While this ratio compares favorably with that in other countries, the necessity of obtaining unpaid observers has prevented the most advantageous distribution of the stations, and some important districts are almost without observations.

Dr. Stefan C. Hepites, the director of the institute, urges the establishment of a system of daily forecasts, which, he estimates, would require an increase in the annual budget of less than 20,000 francs.

---

[1] Analele Institutului Meteorologic al Romaniei, Tomul 16, 1900.

It is a little surprising to find that Roumania, with its agricultural interests and its favorable situation, from a meteorological standpoint, is still without this crowning feature of meteorological work.

The present volume of the Analele includes the following five memoirs:

1. La pluie en Roumanie en 1900. By St. C. Hepites.
2. Revue climatologique annuelle. Année 1900. St. C. Hepites.
3. Étude sur la crue du Jiu au mois d'Aout 1900. Em. de Martonne.
4. Observations magnetique faites à Bucuresci au cours de l'année 1900. I. St. Murat.
5. Registre des tremblements de terre en Roumanie. Année 1900. St. C. Hepites.

The precipitation over the entire kingdom averaged 662 millimeters, exceeding by more than 9 per cent the average of the preceding seventeen years, and was, as usual, most abundant in summer, when 213 millimeters fell. The distribution by altitude is shown in Table 1.

<div align="center">

TABLE 1.

Altitude in meters.	Precipitation in millimeters.	Number of days with rain.
Below 100	591	82
100–200	665	87
200–500	698	91
Above 500	853	100

</div>

The most remarkable rainfall in Roumanian records, if intensity and amount are both considered, occurred on August 17, 1900, when 320 millimeters (12.6 inches) fell at Cara Omer between 8 p. m. and midnight, causing some damage at that and neighboring villages. Cara Omer is situated in the southeast, on the Dobrujan plateau, at an altitude of 150 meters.

The snowfall averaged 86 centimeters, amounting to 100 centimeters in the province of Moldova, where in March

drifts overarched the houses in many villages, and for several days interrupted travel.

Although 1900 was warmer than usual, the maximum temperatures have been lower than in other years. The highest temperature of the year was 37.5° C. at Giurgiu, and the lowest —30.0° at Pancesci-Dragomiresci. From the previous records, we find extremes of +42.8° C. at Giurgiu in 1896 and —35.6° C. at Striharet in 1893. The mean annual temperature at Bukharest for 1900, 11.2°, is 0.9° above the normal, and has been exceeded but four times during the last thirty years.

Table 2 gives data for Bukharest for 1900, and also for the entire period of observations, 1885–1900.

TABLE 2.—*Data for Bukharest for 1900, with entire period of observations, 1885–1900. Latitude 44° 25' N.; longitude 26° 6' E.; altitude, 74 meters.*

| 1900. | Temperature in degrees centigrade. | | | | | | | Mean relative humidity. |
| | Mean. | | | Extremes. | | Daily range. | | |
	Month.	Max.	Min.	Max.	Min.	Greatest.	Least.	
January	— 2.5	0.5	— 5.0	9.5	—14.2	12.0	1.0	93
February	2.7	5.7	0.2	11.5	— 3.9	11.5	1.8	91
March ....'	1.8	6.3	— 1.7	14.8	— 9.1	14.5	2.7	83
April	10.5	16.3	5.6	24.2	— 0.4	15.6	7.0	76
May	16.0	22.8	14.0	30.5	3.0	19.3	4.8	69
June	20.5	27.6	14.0	34.5	10.6	18.5	8.5	67
July	23.0	29.7	16.8	34.9	10.5	17.5	6.6	63
August	22.4	28.9	16.0	34.5	12.4	19.6	4.7	60
September	16.7	23.9	9.5	30.5	6.4	20.0	6.1	64
October	13.8	20.9	7.6	30.5	— 1.8	18.7	3.2	71
November	7.4	9.9	5.0	16.0	0.4	13.3	1.5	84
December........	1.5	5.2	— 1.2	12.1	— 5.3	12.4	2.1	84
Year	11.2	16.2	6.4	34.9	—14.2	20.0	1.0	75
Period, 1885–1900..	10.3	16.2	5.1	40.1	—30.5	....	....	73

| 1900. | Wind. | | Precipitation. | | | Mean cloudiness. |
	Mean velocity. Miles per hour.	Prevailing direction.	Total.	Max. in 24 hours.	Number of days with 0.1 millimeter.	
			mm.			
January	11.2	ene.	81.6	21.5	14	8.7
February	9.4	ene.	61.8	18.7	19	8.4
March	12.5	ene.	80.1	25.8	11	6.3
April	12.8	ene.	43.2	13.4	11	6.4
May	9.8	ene.	49.9	14.5	12	6.1
June..................	7.6	wsw.	97.1	51.4	13	5.0
July..................	7.2	wsw.	66.3	29.7	10	4.0
August	9.2	ene.	117.5	83.6	7	3.6
September............	•4.9	ene,	24.1	12.4	4	2.5
October...............	6.9	ene.	28.3	13.0	9	4.2
November............	10.3	ene.	43.9	17.8	13	8.9
December.............	10.5	wsw.	39.3	18.1	6	6.2
Year.............	9.4	ene.	733 2	83.6	129	5.8
Period, 1885–1900......	8.5	ene	604.8	....	....	5.2

F. O. S.

THE BULLETINS OF THE JAPANESE SERVICE.

The Central Meteorological Observatory of Japan has begun the publication of a new series of bulletins, whose purpose is thus explained in the preface to the first number.

With the present number begins a new series of our publications, under the title of the Bulletin of the Central Meteorological Observatory of Japan. The bulletin is not intended to be published periodically, yet it is proposed to issue the successive numbers at suitable intervals. This publication chiefly contains the results of researches on meteorology and allied sciences made by the members of this observatory. In addition, it is also intended that observations and their discussions on special subjects, which are not included in the routine work of our service, will be published in these reports.

We sincerely hope that by the present bulletins, together with the monthly and annual reports, the general features of meteorology of Japan may be known to the public.

The present number contains the following memoirs:

1. W. Oishi.—Observations of the earth temperature at Tokio.

55——3

A period of seven years, 1886–1892, is covered by the observations, which were made at the surface of the ground and at nine different depths, from .05 meter to 7.0 meters. The surface temperature was observed with an ordinary mercurial thermometer laid on the ground, with the bulb just covered with earth. The results, as regards daily and annual ranges and retardation of extremes, do not materially differ from those obtained elsewhere.

2. Y. Wada.—Température moyenne annuelle de la surface de la mer dans l'océan pacifique occidental.

The author presents the results of observations taken from more than 6000 logs furnished by 1086 ships, both native and foreign, and extending over a period of twenty years, from 1882 to 1901. The region studied is comprised between the one hundred and fourteenth and one hundred and forty-sixth meridians and the twenty-second and forty-sixth parallels, and extends from the Strait of Formosa to the southern corner of the Sea of Okhotsk and from the Chinese coast to about 300 miles east of the Japanese Archipelago. The total number of observations was 133,255, of which about two-thirds were taken during the warmer half of the year and 80 per cent in the Japan Sea and the waters in the neighborhood of the Archipelago proper. Mean temperatures only are considered in this paper.

The highest monthly means occurred generally in August and varied from 30° C. in the Strait of Formosa to 19° C. in the Sea of Okhotsk. The lowest means ranged from —3° in the Gulf of Pechili and in the neighborhood of Vladivostock to 16° off the west coast of Kiushu, and occurred from December to March. The greatest range of temperature occurs in the Gulf of Pechili, where a difference of 27° between the August and February means exists, while a range of but 6° is noted in the vicinity of Formosa. In general, the influence of the ocean currents on the surface temperatures is clearly shown. A table gives the monthly and annual means for each 2-degree square, and these are shown graphically on thirteen charts.

3. T. Okada.—The epochs of occurrence of the first ice in Japan for 1902.

The purpose of this investigation was not to observe the formation of ice on natural bodies of water, but to determine the relative dates of first freezing under artificial and identical conditions. The results might then be accepted as to some extent an exponent of the effect of orography upon climate, a matter of especial interest in a country with the diversified surface and latitudinal extent of Japan.

Observations were made during 1902 at twenty of the meteorological stations, using the ordinary evaporation gage, a copper cylinder two decimeters in diameter and one decimeter in depth, retaining its natural copper color on the outside, but plated on the inside with a pale white zinc alloy. These are set on the surface of ground covered with sod, freely exposed to the sun and wind, and filled with pure well water to a depth of two centimeters at 10 o'clock every morning. The author draws the following conclusions:

In all places frost precedes the ice in the evaporation gage, and the minimum air temperature below 0° C. comes after the first ice.

The date of the first ice retards in general as we proceed toward the south. The variation of the date of the first ice with latitude is about six days per degree.

The distance from the coast, the height above sea level, or orographic conditions characteristic to the *continentality* of the climate, accelerate or retard the occurrence of first ice. Take, for example, the two stations, Takayama and Fukui, under the same latitude. At the former station, lying on the plateau in central Japan, water freezes on the 5th of November, while at the latter, situated near the coast of the Sea of Japan, ice occurs first on the 25th of the same month. The difference is twenty days.

Lines showing the simultaneous occurrence of first ice run almost parallel to the coast line, showing the remarkable influence of the distribution of land and sea on the date of the first ice. The general course of the lines on the chart bears a striking resemblance to that of winter isotherms.